

CLAIMS

ANT 34 ANT

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- 1 An optical waveguide comprising at least a guiding lamina (10) of optical material bonded by direct interfacial bonding to a superstructure lamina (20) of optical material, in which regions of the guiding lamina have modified optical properties so as to define a light guiding path along the guiding lamina (10), characterised in that the waveguide further comprises a second superstructure lamina (20) bonded by direct interfacial bonding to the guiding lamina.
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- 10 ✓ 2. A waveguide according to claim 1, in which the guiding lamina (10) is formed of a ferroelectric material.
- ✓ 3. A waveguide according to claim 2, in which the guiding lamina is formed of lithium niobate.
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- ✓ 4. A waveguide according to claim 2 ~~or claim 3~~, in which the modified regions are electrically poled regions of the guiding lamina.
- ✓ 5. A waveguide according to claim 4, in which the modified regions are spatially periodical electrically poled regions of the guiding lamina.
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- ✓ 6. A waveguide according to ^{claim 1} ~~any one of claims 1 to 4~~, in which the modified regions (130, 150) are formed by indiffusion of one or more dopant materials into the guiding lamina.
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- ✓ 7. A waveguide according to ^{claim 1} ~~any one of claims 1 to 6~~, in which at least part of the modified regions form the light-guiding path.
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- ✓ 8. A waveguide according to ^{claim 1} ~~any one of claims 1 to 6~~, in which the light guiding path (160) is formed of an unmodified region of the guiding lamina, the modified regions defining boundaries of the light guiding path.

ART 34 AMEND

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- ✓ 9. An optical parametric device comprising:
~~according to claim 1~~
a waveguide ~~according to any one of the preceding claims~~; and
means for launching an input optical signal into the waveguide.

- 5 ✓ 10. A device according to claim 9, comprising:
an output filter for filtering light emerging from the waveguide to reduce
components at the wavelength of the input optical signal.

- B7 cover
- 10 ✓ 11. A method of fabricating an optical waveguide, the method comprising the steps
of:

(a) bonding, by direct interfacial bonding, a guiding lamina (10) of optical
material to a superstructure lamina (20) of optical material; and

(b) modifying optical properties of regions (130, 150) of the guiding lamina so as to
define a light guiding path along the guiding lamina, characterised in that the method
15 further comprises the steps of:

(c) after steps (a) and (b), removing material from the guiding lamina to reduce
the thickness of the guiding lamina (10); and

(d) after step (c), bonding, by direct interfacial bonding, a further superstructure
lamina (20) to the guiding lamina.

- 20 12. A method according to claim 11, further comprising:

(e) before step (a), indiffusing and/or out-diffusing material to/from one face of
the guiding lamina to modify regions of the guiding lamina, that face being bonded to the
superstructure lamina in step (a); and

25 (f) before step (d), indiffusing and/or out-diffusing material to/from the exposed
face of the guiding lamina to modify regions of the guiding lamina, that face being
bonded to the further superstructure lamina in step (d).